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Pursuing Excellence

FACULTY OF ENGINEERING
DEPARTMENT OF CHEMICAL AND PROCESS
ENGINEERING

AGRO PROCESSING ENGINEERING PROGRAMME
FINAL YEAR PROJECT REPORT

Design and Construction of a Motorised Potato Chipper

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ABSTRACT

This project report describes the design and fabrication of a portable motorized potato chipper aimed at reducing labour, saving time and increasing productivity of potato chipping, in semi- and urban-centres of Uganda where the demand for potato chips is on increase. Component parts of the potato chipper were designed, fabricated and assembled into a portable prototype. In comparison with hand chipping capacity of 24 kg/h and yielding non-uniform chips, the prototype was tested giving an average production capacity of 339Kg/hr with an efficiency of 93%, and able to chip potatoes to uniform square cross-sections of 10mm × 10mm. The calculated rate of return is 9.5% in only 11 days to recover the initial investment.

Keywords: Potato Chipper, Design, Fabrication, Motorized Operation.

DECLARATION

I MUSISI Samuel, hereby declare to the best of my knowledge, that this final year project report is an outcome of my original work and that it has not been presented to any institution of learning for an academic award.

Signature..........

MUSISI SAMUEL



APPROVAL

This final year project report for the programme of Agro-Processing Engineering has been submitted to the Department of Agro-Processing Engineering for examination with the approval from the following supervisors.

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Dr. MUSINGUZI WILSON BABU

Co-supervisor

Signature

Date

Ms ABBO JACQUELINE

DEDICATION

This report is dedicated to my beloved family in appreciation for their selfless care and unflinching support provided unto me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes I have cherished with firmness and which have indeed made me what I am today. May God's WILL be upon them.

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To the Almighty God goes the Glory for life, wisdom, knowledge, grace, mercy, and protection He has given unto me since childhood. He is worthy of our praise and worship.

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1. INTRODUCTION

This chapter discusses; the production of Irish potato in Uganda, the problem statement, the objectives of the project, the reasons as to why the project should be carried on, giving its purpose and finally the limits of the project.

1.1 Background

Potato (*Solanum tuberosum*) is a starchy, tuberous crop of the Solanaceae family, semi perishable in nature, contains about 80% water and 20% dry matter. In most of the developing countries, potato is considered the fourth most important food crop after rice, wheat and maize. Between 1994 and 2008, potato production in Sub Saharan Africa was estimated to have more than doubled from 100 metric tonnes to 290 metric tonnes with 70% of this growth concentrated in Eastern Africa (FAO, 2008). This increase was attributed to increase in area used to grow potato since average yields have declined considerably due to inadequate use of quality inputs like certified seed and fertilizer. The main drivers of this growth in production are increasing urbanization and population growth and is estimated to rise from 34% in 2010 to 47% by 2015 (Sebatta *et al.*, 2014)

In Uganda, its production is mainly concentrated in the South Western and Eastern highlands (Banabana *et al.*, 2013) which are between 1,500M and 3,000M above sea level (Wang'ombe *et al.*, 2008). The South Western highlands majorly comprised of the districts of Kabale and Kisoro that produce about 60 % of total Ugandan potato output (FAO, 2008) while the Eastern highlands contribute 10 % with the remaining 30%, mainly medium to low land potato coming from the districts of Mubende, Nebbi, Masaka, Mbarara and Rakai and fuelled by the recent introduction of low land varieties (Ferris *et al.*, 2001).

According to UBOS (2010), out of the 154,000 Metric tonnes (Mt) of Irish Potatoes produced during the reference period, the crop disposition was as follows: sold, 62,412 (40.5%); consumed, 60,373 (39.1%); stored, 10,502 (6.8%); and used for other purposes, 19,874 (12.9%). With increasing population and urbanization opens up regional markets and thus growing demand coupled with the increase in fast food restaurants and supermarkets, the potato sub-sector in Uganda is bound to expand as noted by Ferris *et*

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